

POSTER PRESENTATION

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CTLA-4 gene polymorphisms and risk of idiopathic recurrent pregnancy loss in a Tunisian population

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Background

An aberrant regulation of immunological, metabolic, vascular and endocrine processes leads to obstetric complications, including recurrent pregnancy loss (RPL) [1]. Cytotoxic T lymphocyte-associated antigen 4 (CTLA-4) is a negative regulator of T cell activation [2] expressed in placental fibroblasts and may modulate peripheral self-tolerance of the allogenic fetus [3,4]. It is a stimulatory molecule involved in T-cell activation at the maternal-fetal interface in women with unexplained pregnancy loss [5,6]. In this study, we investigate the possible associations of Cytotoxic T lymphocyte-associated antigen 4 (CTLA-4) gene polymorphisms with idiopathic recurrent pregnancy loss (RPL).

Materials and methods

We investigated the association of the CTLA-4 gene single nucleotide polymorphisms (SNPs) -318 C/T (rs5742909), +49A/G (rs231775), and CT60 A/G (rs3087243), by Taq-Man assays in analysis in 470 Tunisian women comprising 235 RPL cases and 235 multi-parous controls. The association of CTLA-4 alleles, genotypes, and haplotypes with RPL was evaluated by Fisher's exact test and regression analysis.

Results

The CTLA-4 variants rs5742909, rs231775, and rs3087243, were in Hardy Weinberg equilibrium, and low linkage disequilibrium was noted between the three studied SNPs. The frequency of rs231775 G allele ($P=0.04$), but not rs3087243 G allele ($P=0.61$) or rs5742909 T allele ($P=1$), was higher in RPL cases than in control women. Significant differences in

the distribution of rs231775 ($P<0.02$), but not rs5742909 ($P=0.21$) or rs3087243 ($P=0.49$) genotypes were seen between cases and controls, and only rs231775 showed a significant association with RPL, with increments of 1.74 in disease risk seen for heterozygous carriers. Only rs231775 (+49A/G), previously shown associated with the immuno-pathogenesis of RPL, and it confers susceptibility to RPL in Chinese population [5] and North Indian Women [7], was significantly associated with RPL. Among the six three-locus CTLA-4 haplotypes constructed (rs5742909/rs231775/rs3087243), increased frequency of CGA ($P=0.0046$), and CAG ($P=0.036$) haplotypes were seen in RPL cases, thus conferring disease susceptibility nature to these haplotypes.

Conclusions

The rs231775 AG genotype and CGA and CAG haplotypes may contribute to RPL development in a Tunisian Population.

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References

1. Baek KH: Aberrant gene expression associated with recurrent pregnancy loss. *Mol Hum Reprod* 2004, **10**(5):291-7.
2. Bashyam H: CTLA-4: From conflict to clinic. *J Exp Med* 2007, **204**(6):1243.
3. Anjos SM, Polychronakos C: Functional evaluation of the autoimmunity-associated CTLA-4 gene: the effect of the (AT) repeat in the 3'untranslated region (UTR). *J Autoimmun* 2006, **27**(2):105-9.
4. Kaufman KA, Bowen JA, Tsai AF, Bluestone JA, Hunt JS, Ober C: The CTLA-4 gene is expressed in placental fibroblasts. *MHR: Basic science of reprod. Medicine* 1998, **5**(1):84-87.
5. Wang X, Lin Q, Ma Z, Hong Y, Zhao A, Di W, Lu P: Association of the A/G polymorphism at position 49 in exon 1 of CTLA-4 with the susceptibility to unexplained recurrent spontaneous abortion in the Chinese population. *Am J Reprod Immunol* 2005, **53**(2):100-5.
6. Wang X, Ma Z, Hong Y, Lu P, Line Q: Expression of CD28 and cytotoxic T lymphocyte antigen 4 at the maternal-fetal interface in women with

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unexplained pregnancy loss. *International Journal of Gynecology & Obstetrics* 2006, **93**(2):123-129.

7. Gupta, *et al.*: Association of CTLA-4 and TNF- α polymorphism with recurrent miscarriage among North Indian women. *Cytokine* 2012, **60**(2):456-62.

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